

Appl. No. 10/636,028

**REMARKS**

Claims 1, 6, 9, 16 and 18-21 are amended. Claims 24-36 are cancelled. Claims 1-23 are pending in the application.

In response to the Examiner's request for restriction, applicant hereby affirms the election without traverse to prosecute the invention of Group I (claims 1-23). Claims 24-36 are appropriately cancelled as being directed to a non-elected invention.

Claims 6 and 9 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. With respect to claim 6 the Examiner indicates that the recited "at least one surface" is not clear. Without admission as to the propriety of the Examiner's statements, claim 6 is amended to recite "at least one internal surface". With respect to claim 9, the Examiner indicates that the recited "deposition chamber" lacks antecedent basis. Claim 9 is amended to recite "the processing chamber", for which antecedent basis is provided in claim 1. Accordingly, applicant respectfully requests withdrawal of the § 112 rejection of claims 6 and 9 in the Examiner's next action.

Claims 1-4, 6-16, 19-20 and 22-23 stand rejected under 35 U.S.C. § 102(b) as being anticipated by either or both of Jackson (U.S. Patent No. 5,013,366); and Cotte (U.S. Patent No. 6,454,869). In accordance with MPEP § 2131, anticipation requires each and every element of a claim to be disclosed in a single prior art reference. Claims 1-4, 6-16, 19-20 and 22-23 are allowable over Jackson and Cotte for at least the reason that neither of the references discloses each and every element in any of those claims.

As amended, independent claim 1 recites a method of cleaning a processing chamber by contacting residue material over at least one internal chamber surface with a

Appl. No. 10/636,028

supercritical fluid, where the residue is formed during one or more processing event conducted within the processing chamber selected from the group consisting of material deposition, etching, annealing, photolithography, ion implantation, and chemical mechanical polishing. The amendment to claim 1 is supported by the specification at, for example, paragraph 22 and Fig. 1. Each of Jackson and Cotte specifies placement of objects to be cleaned into a vessel or chamber that is designed particularly for such cleaning purpose (see Jackson at col. 5, ll. 62 through col. 6, ll. 16; col. 7, ll. 62-67; col. 8, ll. 60-64 and the description of vessels at columns 9-13 and Figs. 5-9; and see Cotte at Fig. 1 and col. 2, ll. 37-65). Neither Jackson nor Cotte discloses the claim 1 recited processing chamber having a residue material formed over at least one internal surface during one or more processing event conducted within the processing chamber selected from the recited group, and contacting the residue material with supercritical fluid to remove at least some of the residue material. Accordingly, independent claim 1 is not anticipated by either Jackson or Cotte.

Dependent claims 2-4 and 6-15 are not anticipated by either Jackson or Cotte for at least the reason that they depend from non-anticipated base claim 1.

As amended, independent claim 16 recites providing a cleaning agent comprising carbon dioxide into a portion of a deposition system, and contacting deposited material on an internal surface of the deposition system with the cleaning agent to solubilize at least a portion of the deposited material. The amendment to claim 16 is supported by the specification at paragraph 22 and Fig. 1. Neither Jackson nor Cotte discloses providing a cleaning agent into a deposition system or contacting deposited material on an internal

Appl. No. 10/636,028

surface of the deposition system with cleaning agent. Accordingly, independent claim 16 is not anticipated by Jackson or Cotte.

Dependent claims 18-21 are amended to properly depend from independent claim 16. Dependent claims 19-20 and 22-23 are not anticipated by Jackson or Cotte for at least the reason that they depend from non-anticipated base claim 16.

Dependent claims 2, 5, 9, 17, 18 and 21 stand rejected under 35 U.S.C. § 103(a) as being rendered obvious by Jackson or Cotte, considered individually or in combination with either Goffnett (U.S. Patent No. 5,108,512); or Smith (U.S. Patent No. 4,177,768). The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Claims 2, 5, 9, 17, 18 and 21 are allowable over the various combinations of Jackson, Cotte, Goffnett and Smith for at least the reason that the references, individually or in combination, fail to disclose or suggest each and every limitation in any of those claims.

As indicated above, neither Jackson nor Cotte discloses the claim 1 or claim 16 internal surfaces of a processing chamber or deposition system and removal of residue or deposited material from over such surfaces using the cleaning agents recited in these claims. Nor does Jackson or Cotte suggest these recited features. Accordingly, independent claims 1 and 16 are not rendered obvious by Jackson and Cotte considered individually or in combination.

Referring to the Smith disclosure, such teaches placement of workpieces to be cleaned within a vessel designed particularly for the particular cleaning purposes (see the

Appl. No. 10/636,028

drawing and the text at col. 3, ll. 35-51 and col. 4, ll. 38-39). The Examiner indicates at page 8 of the present Action that Smith is relied upon as disclosing removing a residue by primary solvent followed by supercritical carbon dioxide. However, when considered in combination with either of Jackson or Cotte, the Smith disclosure of cleaning objects within a vessel particularly configured for cleaning purposes fails to contribute toward suggesting the claim 1 and claim 16 recited cleaning residue or material from internal surfaces of a processing chamber or deposition system. Accordingly, the combination of Jackson, Cotte and Smith fails to suggest each and every element in either claim 1 or claim 16.

At page 8 of the present Action the Examiner indicates reliance upon Goffnett as disclosing material from a surface of a chemical vapor deposition chamber. The Examiner indicates that "one would expect that supercritical fluid would remove residue in the CVD chamber" because it is "known in the art to clean a CVD chamber as disclosed by Goffnett". Applicant notes, however, that the Goffnett disclosure specifies utilization of solid carbon dioxide particles to dislodge deposits from chamber walls (col. 3, ll. 7-36). Independent claim 1 specifically recites utilization of a supercritical fluid and independent claim 16 specifically recites utilizing either a liquid phase or a supercritical phase. The cleaning methodology disposed by Goffnett is based upon an entirely different cleaning principle. Accordingly, the Goffnett disclosure does not contribute toward suggesting contacting residue or deposited material within the recited chamber surfaces utilizing supercritical or liquid cleaning agents. Accordingly, the combination of Jackson and Cotte with Goffnett fails to suggest each and every element in either claim 1 or claim 16. Accordingly, claims 1 and 16 are allowable over the various cited combinations of Jackson, Cotte, Goffnett and Smith.

Appl. No. 10/636,028

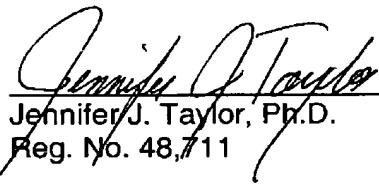
Dependent claims 2, 5, 9, 17, 18 and 21 are allowable over the cited combinations of Jackson, Cotte, Goffnett and Smith for at least the reason that they depend from corresponding allowable base claims 1 and 16.

For the reasons discussed above, pending claims 1-23 are allowable. Accordingly, applicant respectfully requests formal allowance of such pending claims in the Examiner's next action.

Respectfully submitted,

Dated: November 18, 2005

By:

  
Jennifer J. Taylor, Ph.D.  
Reg. No. 48,711